

THE PARASITIC HYMENOPTERA WITH THE LONGEST OVIPOSITORS, WITH DESCRIPTIONS OF TWO NEW ICHNEUMONIDAE¹

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ABSTRACT: Parasitic Hymenoptera seldom have the ovipositor longer than 1.3 the length of the head and body. A few species of Stephanidae, Braconidae, Ichneumonidae, and Callimomidae have ovipositors much longer, about 1.6 to 14.0 as long as the head and body. How these long ovipositors are managed is unknown. Two Neotropic *Dolichomitus* with unusually long ovipositors are described.

DESCRIPTORS: Long ovipositors, oviposition, parasites, Stephanidae, Braconidae, Ichneumonidae, Callimomidae, *Dolichomitus*.

Parasitic Hymenoptera are usually thought of as having long ovipositors. Many of them do, but most of the species do not. The ovipositor varies from so short that it does not protrude beyond the end of the abdomen, to around 1.0 or up to 1.3 as long as the head and body. A few species have it even longer.

There is a reason that the ovipositor is seldom more than 1.3 as long as the head and body: In the Ichneumonoidea as examples, the ovipositor is thrust in approximately perpendicularly, and to get it perpendicular the female must have the tip of the abdomen (whence the ovipositor originates) as far from the substrate as the ovipositor is long. To do this she stands on the tips of her tarsi, cocks her rear upward, and turns the ovipositor downward from the elevated tip of her abdomen. Since she stands on the tips of her legs (of which the front legs are shortest) and her body reaches upward from the base of her front legs, the total upward reach cannot be greater than the length of the front legs plus the distance from the front coxae to the tip of the abdomen,

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and the longest ovipositor manageable in the conventional way is equal to that total reach. But this paper concerns species with ovipositors much longer than that.

One of the most familiar species with the ovipositor longer than the body plus the front legs is *Megarhyssa*. In this genus the base of the ovipositor can be looped into a membranous sac at the tip of the abdomen to take up part of the length when oviposition begins. The ovipositor can then be inserted in the usual perpendicular direction. One can recall also Orussidae and *Ibalia* (Cynipidae), which coil their unusually long ovipositors within the body and can feed them out as oviposition progresses. But there are also some parasitic Hymenoptera with extraordinarily long ovipositors and with no apparent ways to manage them. Probably in many of these cases the ovipositors are used not for actual drilling but for running into tunnels from an open entry, into which the ovipositor tip can be maneuvered. Hitting a tunnel opening with the tip of a long ovipositor would be a feat in itself, which would require sensitivity in the ovipositor tip and an ability to flex the tip in different directions. Species with shorter ovipositors often have both sensitivity and flexibility in the tip in some degree. Those with extraordinarily long ovipositors would need only some enhancement of those abilities. Although reasonable theories can be devised on how the very long ovipositors are manipulated, we need observations, and actual observations will probably bring some surprises. Whatever the methods that allow escape from the usual restriction in ovipositor length, once that restriction is evaded the ovipositor can become exceedingly long.

Below is a representative list of some of the parasitic Hymenoptera with unusually long ovipositors (omitting *Ibalia* and the Orussidae). Among the species listed only *Megarhyssa atrata* is known to have a mechanism for coping with the unusual ovipositor length. The list below is more extensive in the Ichneumonidae than elsewhere, in part because I am more familiar with this family than with the others.

Some Hymenoptera with unusually long ovipositors

(The figure after each name is the length of the ovipositor divided by the length of the head and the body).

Stephanidae

Schlettererius cinctipes Cresson (western USA and Canada). 2.3

Braconidae

(Vipiinae)

Compsobracon sp. (Peru) 4.1

Euurobracon yokohamae Dalla Torre (Japan). 7.7

Iphiaulax? sp. (Colombia). 14.0

Rhamnura filicauda Enderlein (West Africa). 2.7

(Helconinae)

Eumacrocentrus americanus Cresson (eastern U.S.A. and Canada). 3.6

Ichneumonidae

(Ephialtinae)

Dolichomitus bivittatus, new species (Peru). 4.5

Dolichomitus cephalotes Holmgren (Holarctic Region). 4.5

Dolichomitus hypermeceus, new species (Peru). 8.1

Dolichomitus longicauda Smith (Colombia). 4.6

Dolichomitus magaloura Morley (Brazil). 3.3

Pimpla zirnitsi Ozols (eastern Russia). 3.5

Megarhyssa atrata Fabricius (eastern U.S.A. and Canada). 3.3

(Labiinae)

Apechoneura longicauda Kriechbaumer (South America). 2.7

(Gelinae)

Mastrus extensor Cushman (California). 1.6

Dotocryptus bellicosus Spinola (Argentina and Chile). 3.0

Mesostenus longicauda Cresson (U.S.A.). 3.0

(Acaenitinae)

Procinetus vipioniformis Schmiedeknecht (Spain). "almost 4.0"

Callimomidae

Undetermined species (Ethiopian Region). 4.6

Undetermined species (Brazil). 5.3

For the above list I have depended on taxonomic descriptions for the ovipositor lengths of *Euurobracon yokohamae*, *Rhamnura filicauda*, *Pimpla*

zirnitsi, and *Procinetus vipioniformis*. The *Iphiaulax?* sp. listed was figured by Berland (1951. In Grasse: *Traite de Zoologie* 10: 918). In the other cases measurements were made directly from specimens. Within a species, there is some variation in ovipositor lengths and I tended to choose the specimens with the longest ovipositors for measurement.

Two undescribed species of *Dolichomitus* (Ichneumonidae) are listed in the above table and these are described below. In one of these, *Dolichomitus hypermeceus*, the ovipositor is relatively and absolutely longer than in any other known insect, except for the "*Iphiaulax*" figured by Berland.

Dolichomitus bivittatus, new species

Male: Unknown.

Female: Front wing 17 to 19 mm. long. Head and body 19 to 20 mm. long. Body short and stout, polished, its punctures very sparse. Face wide, polished, medially protuberant, its median $0.6 \pm$ with moderately small punctures that are separated by about 2.0 their diameter. Head across midlength of temples about 0.87 as wide as across eyes. Clypeus wide, strongly impressed near apex, its apex strongly concave at center. Mandible moderately short and wide, its teeth equal. Prepectal carina present on mesosternum, absent from mesopleurum. Mesopleurum polished, with medium sized sparse punctures, below subtegular ridge with a group of oblique, parallel close wrinkles that curve downward on front part of mesopleurum and reach to sternal part of prepectus. Mesoscutum polished, with numerous hairs on front corner and sparse hairs near margin, elsewhere hairless, the setiferous punctures small. Propodeum polished, its punctures small and sparse, without median dorsal carinae. Pleural carina or propodeum weak and blunt but complete. First tergite about 1.7 as long as wide, polished, with very sparse punctures, its median dorsal carinae reaching only half way to spiracle and dorsolateral carina absent. Second tergite about 0.93 as long as wide. Ovipositor sheath about 12.0 as long as hind tibia. Ovipositor 6.4 to 9.3 cm. long, 3.8 to 4.6 as long as head and body. Dorsal lobe of lower valve of ovipositor tip moderately developed, with four ridges.

Head, mandible, and antenna black. Palpi brown. Thorax, tegula, and abdomen bright fulvo-ferruginous, the propleurum, collar, small sublateral spot on apical rim of propodeum, and small apicolateral spot on tergite 2 black. Legs blackish, most of the front of front and middle femora stramineous and front and middle tibiae and tarsi fulvous or light brown. Wings yellowish, the front wing fuscous beyond center of areolet

and with a fuscous band reaching from nervulus to base of stigma. Hind wing with a subapical light fuscous band.

Type: ♀, Utcuyacu, 2000± m., Prov. Tarma, Peru, March 8, 1948, Felix Woytkowski (Townes).

Paratype: ♀, same locality and collector as type, March 1, 1948 (Townes).

Dolichomitus hypermeces, new species

Male: Unknown.

Female: Front wing 19 to 22 mm. long. Head and body 18 to 21 mm. long. Body short and stout, polished, its punctures very sparse. Face wide, polished, its median $0.6\pm$ with moderately small punctures that are separated by about 5 times their diameter. Head across midlength of temples about 0.86 as wide as across eyes. Clypeus wide, weakly impressed near apex, its apex weakly concave at center. Mandible short and wide, the lower tooth almost as long as upper tooth. Prepectal carina present on mesosternum, ending opposite lower corner of pronotum. Mesopleurum polished, with small very sparse punctures. Mesoscutum polished, with numerous hairs on front corner and a very few hairs near margin, elsewhere hairless, the setiferous punctures small. Propodeum polished, its punctures small and very sparse, without median dorsal carinae. Pleural carina of propodeum present in front of spiracle, behind spiracle replaced by a groove. First tergite about 1.5 as long as wide, polished and with very sparse hairs, its dorsal carinae present only basad of spiracle and dorsolateral carina lacking. Second tergite about 0.79 as long as wide. Ovipositor sheath about 21.0 as long as hind tibia. Ovipositor 7.0 to 8.1 as long as head and body, 11.6 to 18.0 cm. long. Dorsal lobe of lower valve of ovipositor tip moderately developed, with four ridges.

Head, mandible, and antenna black. Palpi brown. Thorax black with pronotum except for collar, all of mesothorax, tegula, metanotum except for upper side of postscutellum, and often a stain on lower part of propleurum bright fulvo-ferruginous. Front and middle legs fulvous, the middle trochanters usually more or less fuscous, last segment of front tarsus often fuscous, and middle tarsus with apical 2 or 3 segments or all segments black. Hind leg black. Front wing brown, with a broad pale yellowish brown band reaching from base of stigma to apex of areolet. Hind wing irregularly light brown. Abdomen black, the first 2 segments fulvoferruginous.

This is the species figured by Bischoff as an "undetermined Pimplinae" (1927. *Biologie der Hymenopteren*, p. 334, fig. 148b). The specimen designated as type is the specimen figured by Bischoff.

Type: ♀, Dept. Cuzco, Peru, collected by Garlepp (Berlin).

Paratypes: 4♀, same data as type (Berlin), ♀, Hacienda Maria, 400 m., Paucartambo, Cuzco, Peru, February 28, 1952, Felix Woytkowski (Townes). I have seen also a female in the Geneva museum but this is not now at hand for inclusion in the type series.